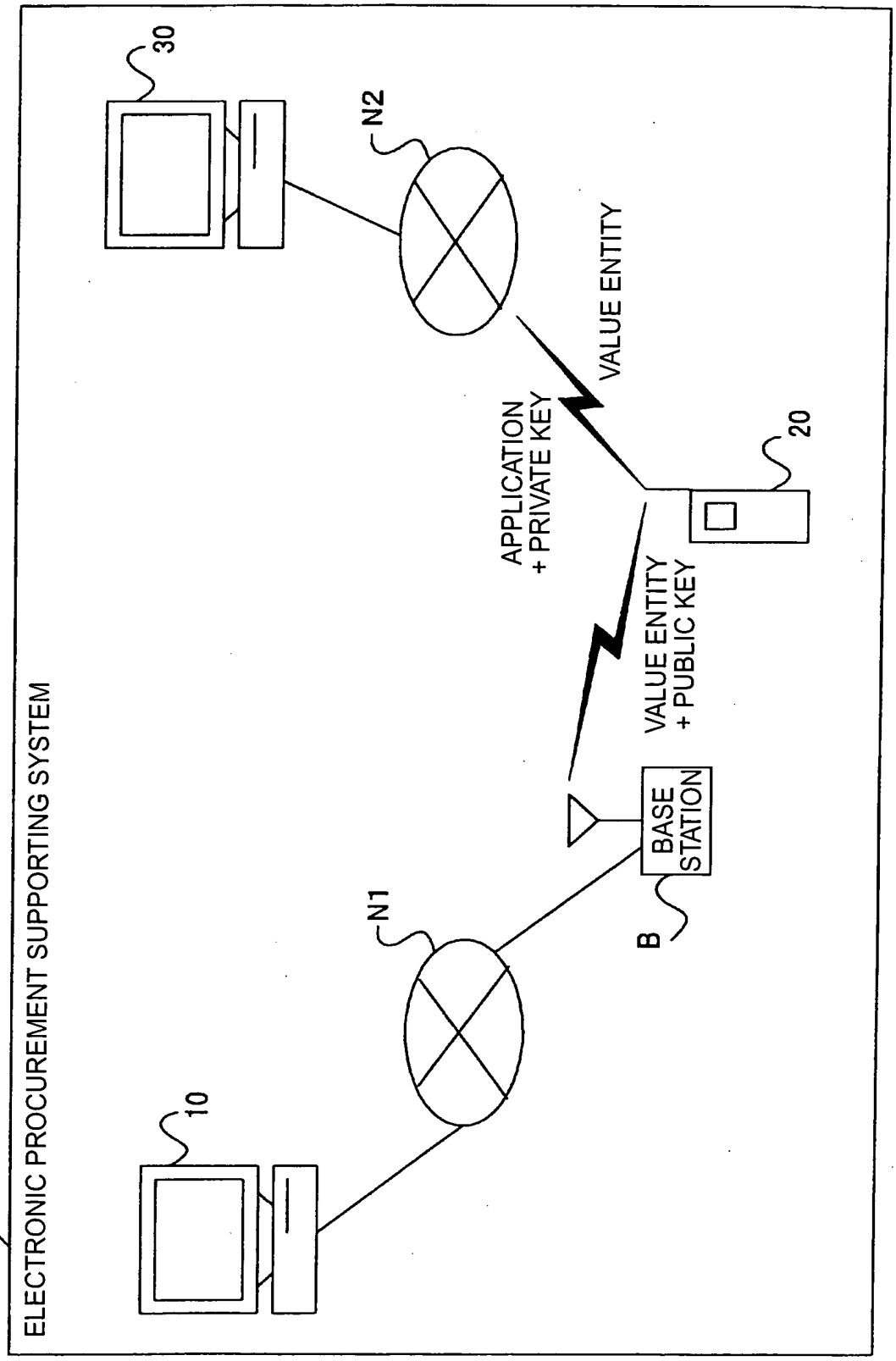
Fig.1


1
ELECTRONIC PROCUREMENT SUPPORTING SYSTEM
10
30
N1
N2
BASE STATION
B
APPLICATION + PRIVATE KEY
VALUE ENTITY
VALUE ENTITY + PUBLIC KEY
20

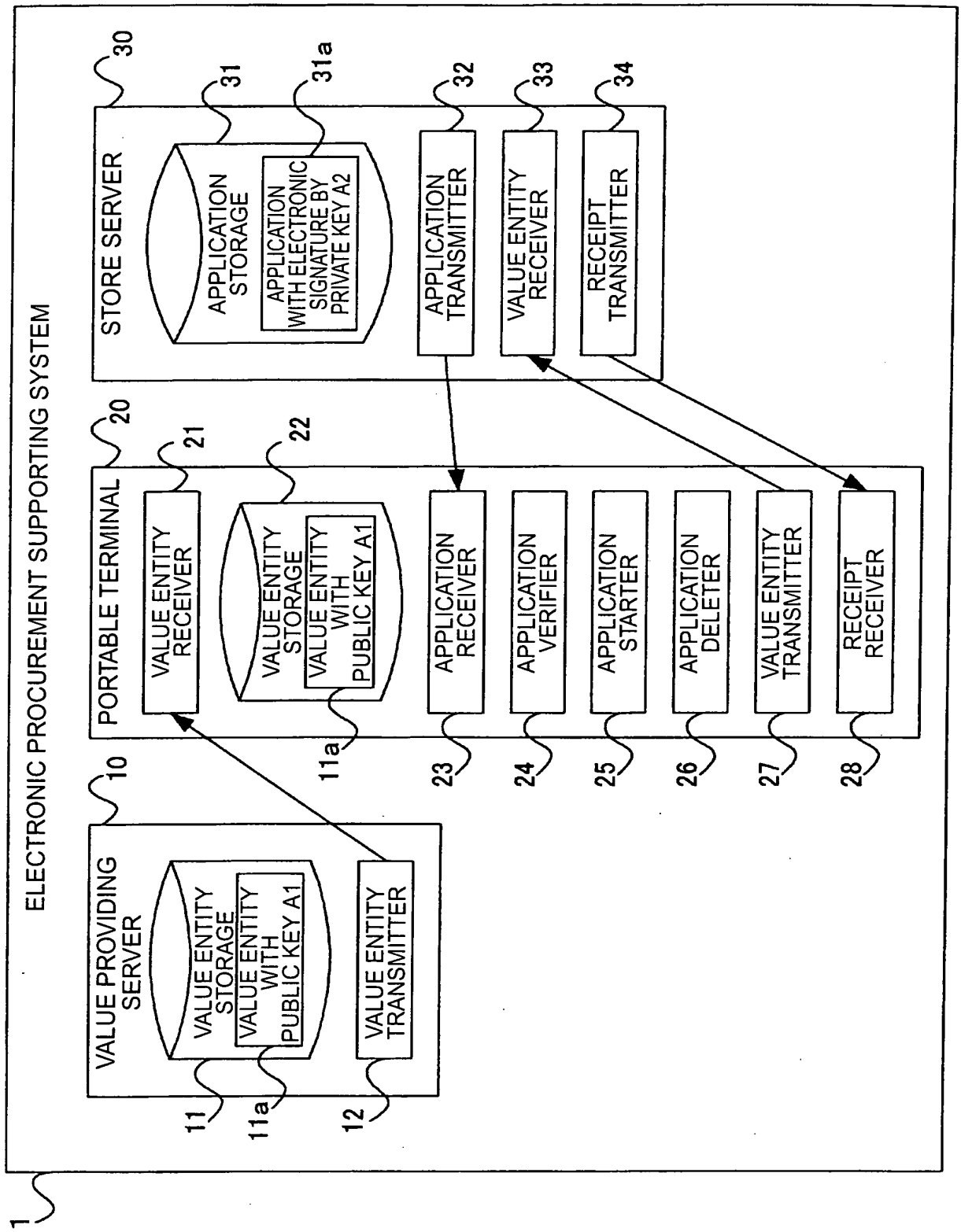
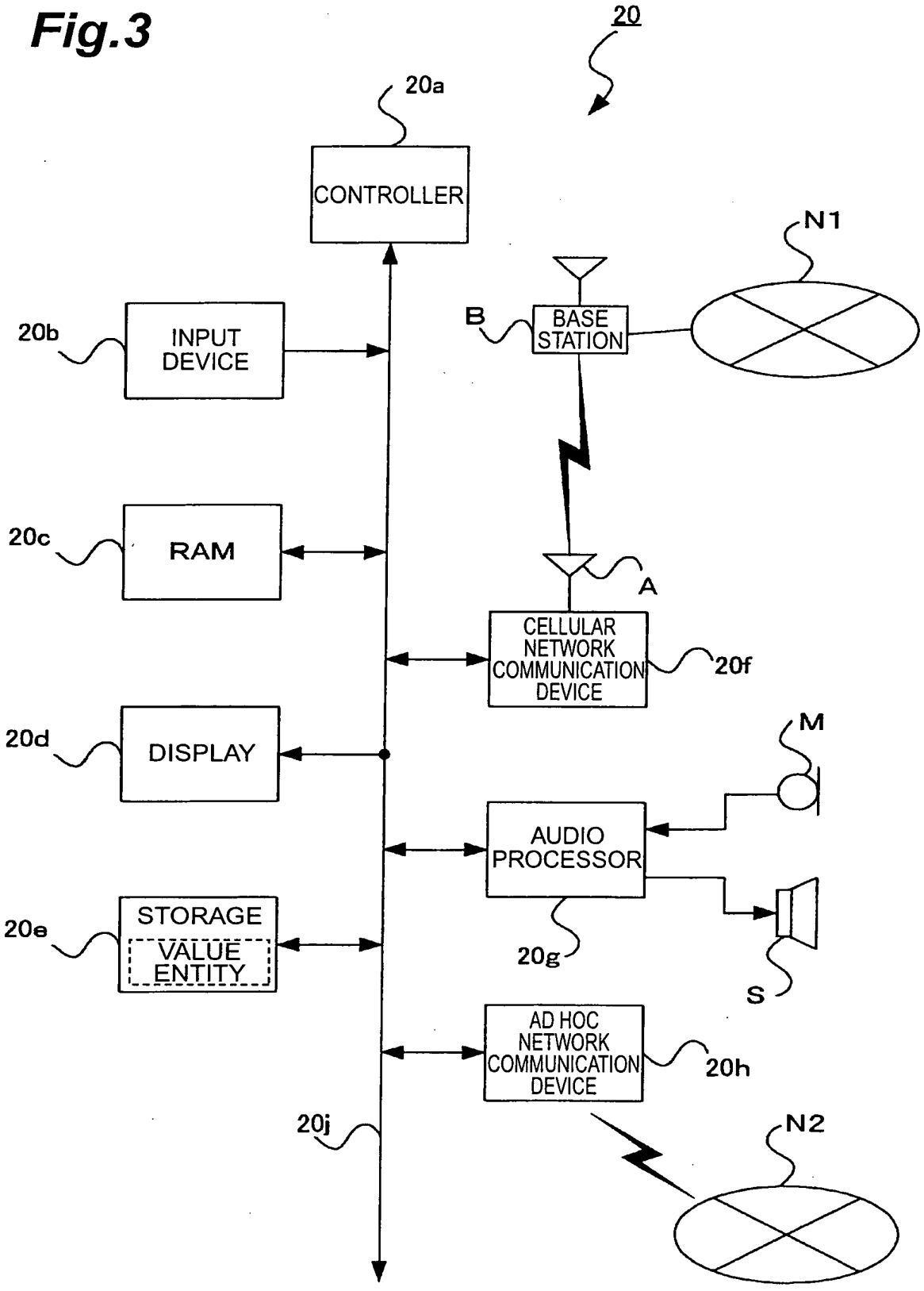

ELECTRONIC PROCUREMENT SUPPORTING SYSTEM
1
STORE SERVER
30
APPLICATION STORAGE
31
APPLICATION WITH ELECTRONIC SIGNATURE BY PRIVATE KEY A2
31a
APPLICATION TRANSMITTER
32
VALUE ENTITY RECEIVER
33
RECEIPT TRANSMITTER
34
PORTABLE TERMINAL
20
VALUE ENTITY RECEIVER
21
VALUE ENTITY STORAGE
22
VALUE ENTITY WITH PUBLIC KEY A1
11a
APPLICATION RECEIVER
23
APPLICATION VERIFIER
24
APPLICATION STARTER
25
APPLICATION DELETER
26
VALUE ENTITY TRANSMITTER
27
RECEIPT RECEIVER
28
VALUE PROVIDING SERVER
10
VALUE ENTITY STORAGE
11
VALUE ENTITY WITH PUBLIC KEY A1
11a
VALUE ENTITY TRANSMITTER
12

Fig.2

Fig.3


20
20a
CONTROLLER
N1
B
BASE STATION
20b
INPUT DEVICE
20c
RAM
A
CELLULAR NETWORK COMMUNICATION DEVICE
20f
20d
DISPLAY
M
AUDIO PROCESSOR
20e
STORAGE
VALUE ENTITY
20g
S
AD HOC NETWORK COMMUNICATION DEVICE
20h
20j
N2

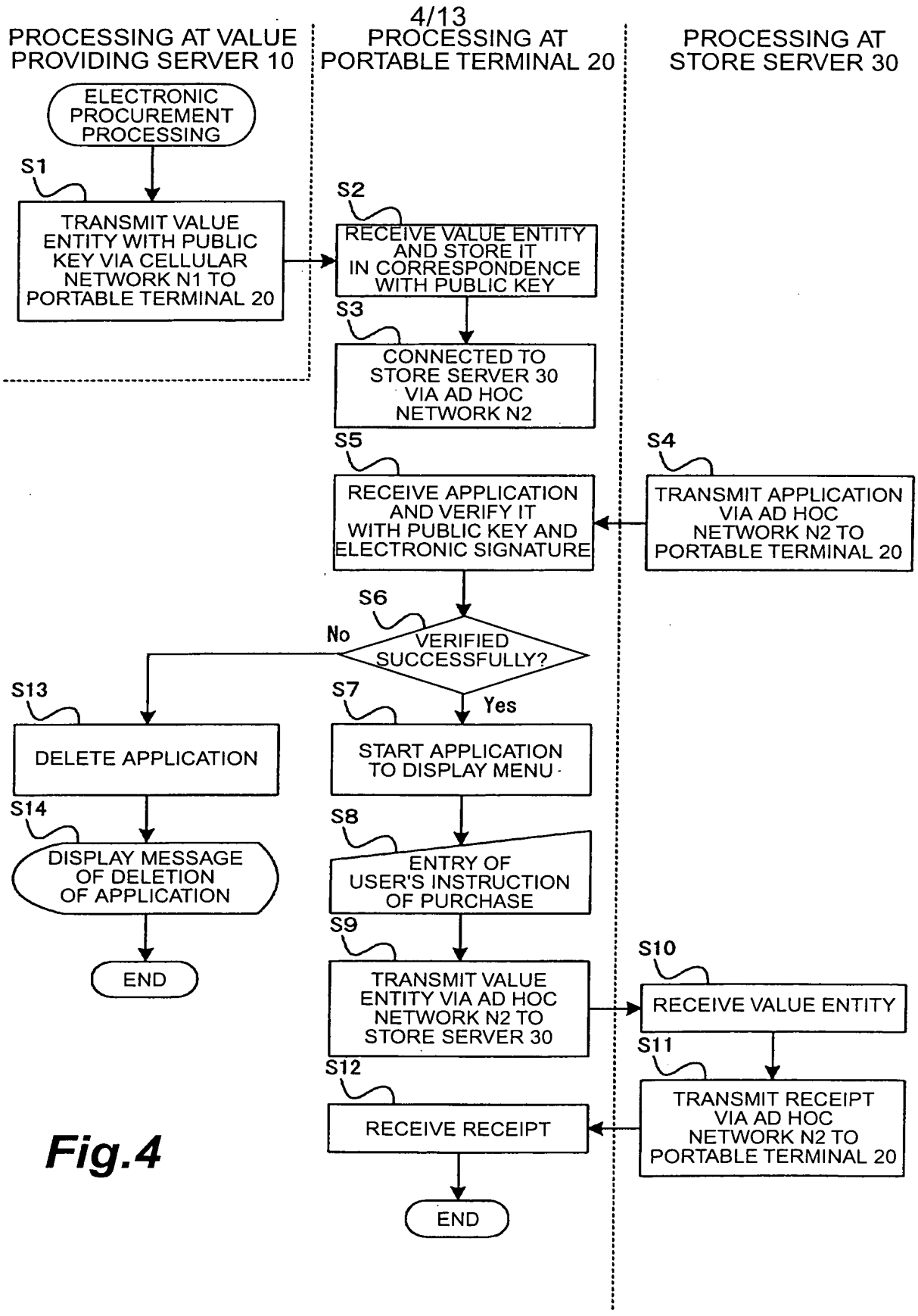

PROCESSING AT VALUE PROVIDING SERVER 10
PROCESSING AT PORTABLE TERMINAL 20
PROCESSING AT STORE SERVER 30
ELECTRONIC PROCUREMENT PROCESSING
S1
TRANSMIT VALUE ENTITY WITH PUBLIC KEY VIA CELLULAR NETWORK N1 TO PORTABLE TERMINAL 20
S2
RECEIVE VALUE ENTITY AND STORE IT IN CORRESPONDENCE WITH PUBLIC KEY
S3
CONNECTED TO STORE SERVER 30 VIA AD HOC NETWORK N2
S4
TRANSMIT APPLICATION VIA AD HOC NETWORK N2 TO PORTABLE TERMINAL 20
S5
RECEIVE APPLICATION AND VERIFY IT WITH PUBLIC KEY AND ELECTRONIC SIGNATURE
S6
VERIFIED SUCCESSFULLY?
No
Yes
S13
DELETE APPLICATION
S14
DISPLAY MESSAGE OF DELETION OF APPLICATION
END
S7
START APPLICATION TO DISPLAY MENU
S8
ENTRY OF USER'S INSTRUCTION OF PURCHASE
S9
TRANSMIT VALUE ENTITY VIA AD HOC NETWORK N2 TO STORE SERVER 30
S10
RECEIVE VALUE ENTITY
S11
TRANSMIT RECEIPT VIA AD HOC NETWORK N2 TO PORTABLE TERMINAL 20
S12
RECEIVE RECEIPT
END

Fig.4

Fig.5

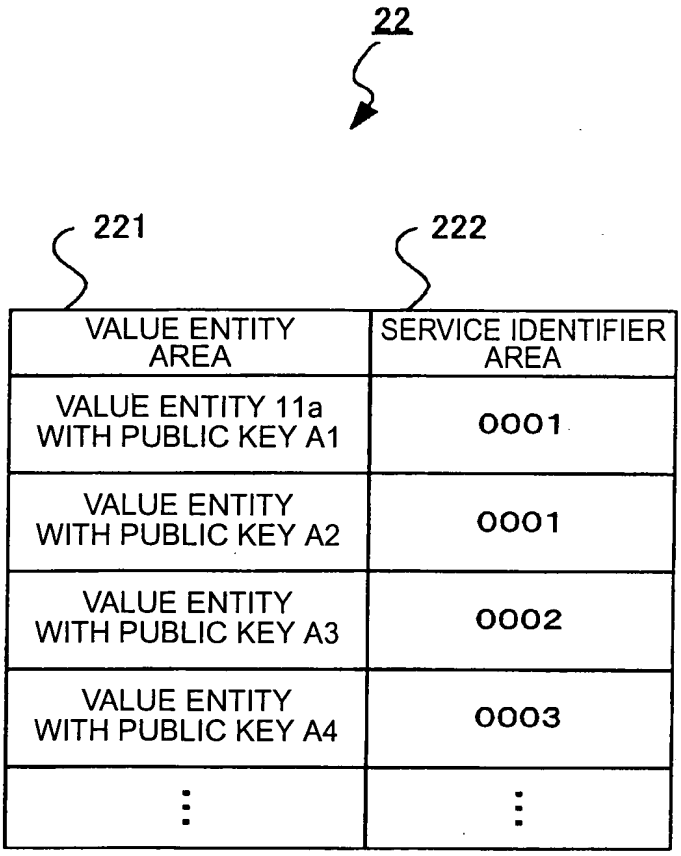
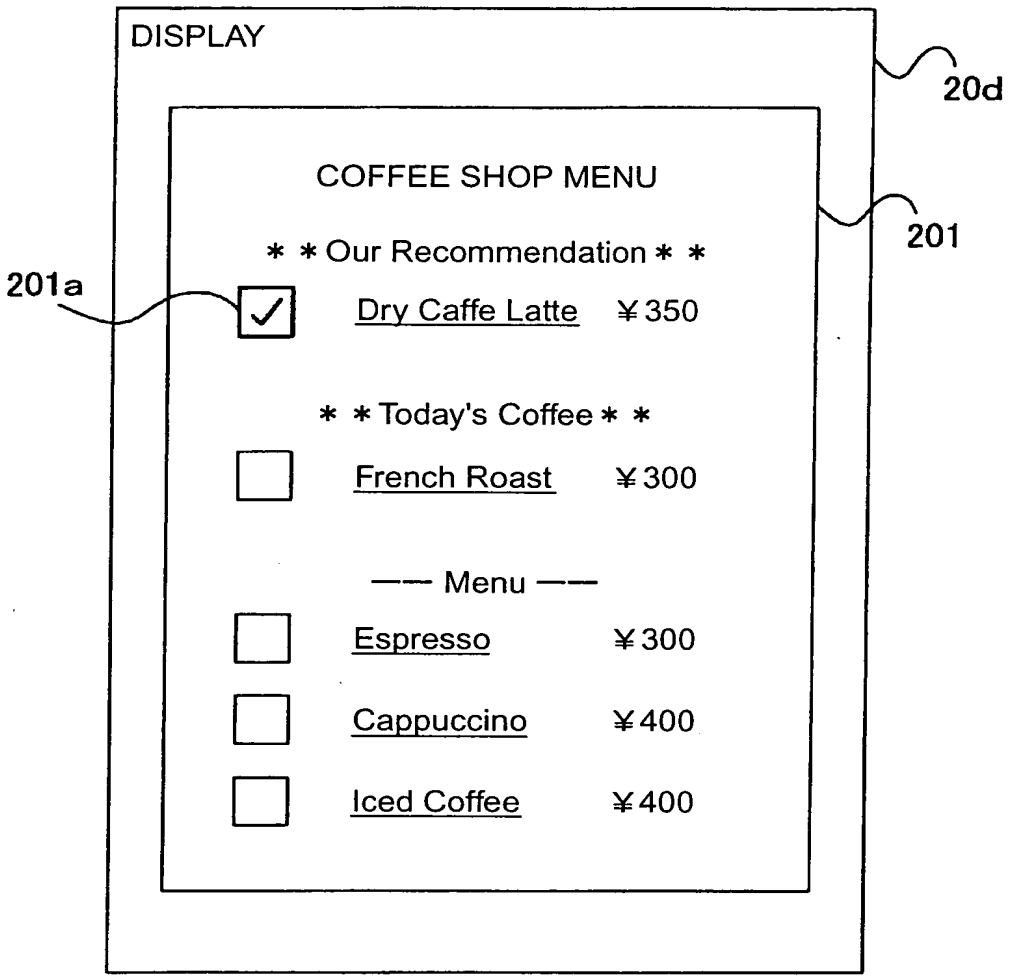

22
221
222
VALUE ENTITY AREA
SERVICE IDENTIFIER AREA
VALUE ENTITY 11a WITH PUBLIC KEY A1
0001
VALUE ENTITY WITH PUBLIC KEY A2
0001
VALUE ENTITY WITH PUBLIC KEY A3
0002
VALUE ENTITY WITH PUBLIC KEY A4
0003

Fig.6


DISPLAY
20d
COFFEE SHOP MENU
201
* * Our Recommendation * *
201a
Dry Caffe Latte ¥350
* * Today's Coffee * *
French Roast ¥300
—— Menu ——
Espresso ¥300
Cappuccino ¥400
Iced Coffee ¥400

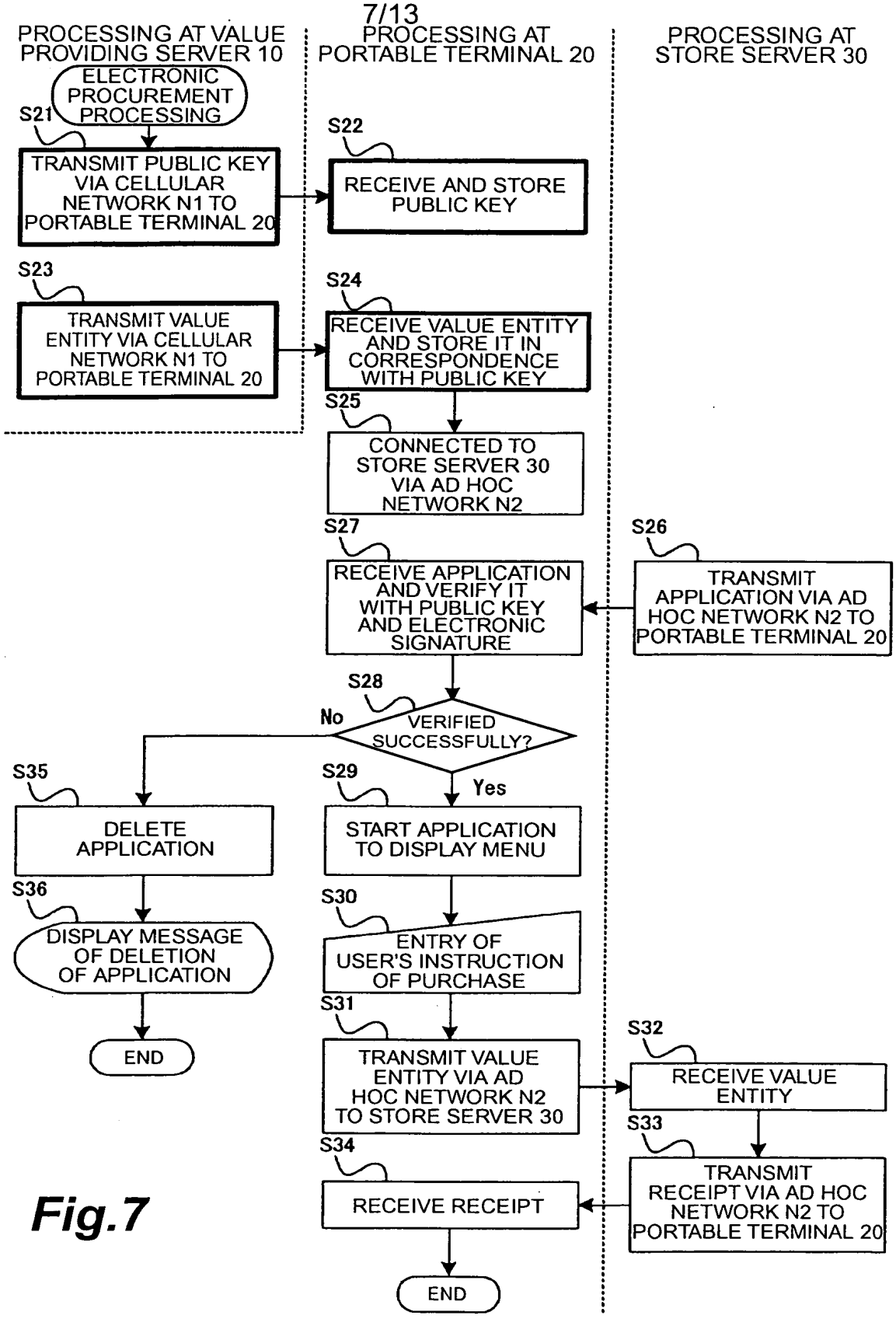

PROCESSING AT VALUE PROVIDING SERVER 10
PROCESSING AT PORTABLE TERMINAL 20
PROCESSING AT STORE SERVER 30
ELECTRONIC PROCUREMENT PROCESSING
S21
TRANSMIT PUBLIC KEY VIA CELLULAR NETWORK N1 TO PORTABLE TERMINAL 20
S22
RECEIVE AND STORE PUBLIC KEY
S23
TRANSMIT VALUE ENTITY VIA CELLULAR NETWORK N1 TO PORTABLE TERMINAL 20
S24
RECEIVE VALUE ENTITY AND STORE IT IN CORRESPONDENCE WITH PUBLIC KEY
S25
CONNECTED TO STORE SERVER 30 VIA AD HOC NETWORK N2
S26
TRANSMIT APPLICATION VIA AD HOC NETWORK N2 TO PORTABLE TERMINAL 20
S27
RECEIVE APPLICATION AND VERIFY IT WITH PUBLIC KEY AND ELECTRONIC SIGNATURE
S28
VERIFIED SUCCESSFULLY?
No
Yes
S35
DELETE APPLICATION
S36
DISPLAY MESSAGE OF DELETION OF APPLICATION
END
S29
START APPLICATION TO DISPLAY MENU
S30
ENTRY OF USER'S INSTRUCTION OF PURCHASE
S31
TRANSMIT VALUE ENTITY VIA AD HOC NETWORK N2 TO STORE SERVER 30
S32
RECEIVE VALUE ENTITY
S33
TRANSMIT RECEIPT VIA AD HOC NETWORK N2 TO PORTABLE TERMINAL 20
S34
RECEIVE RECEIPT
END

Fig.7

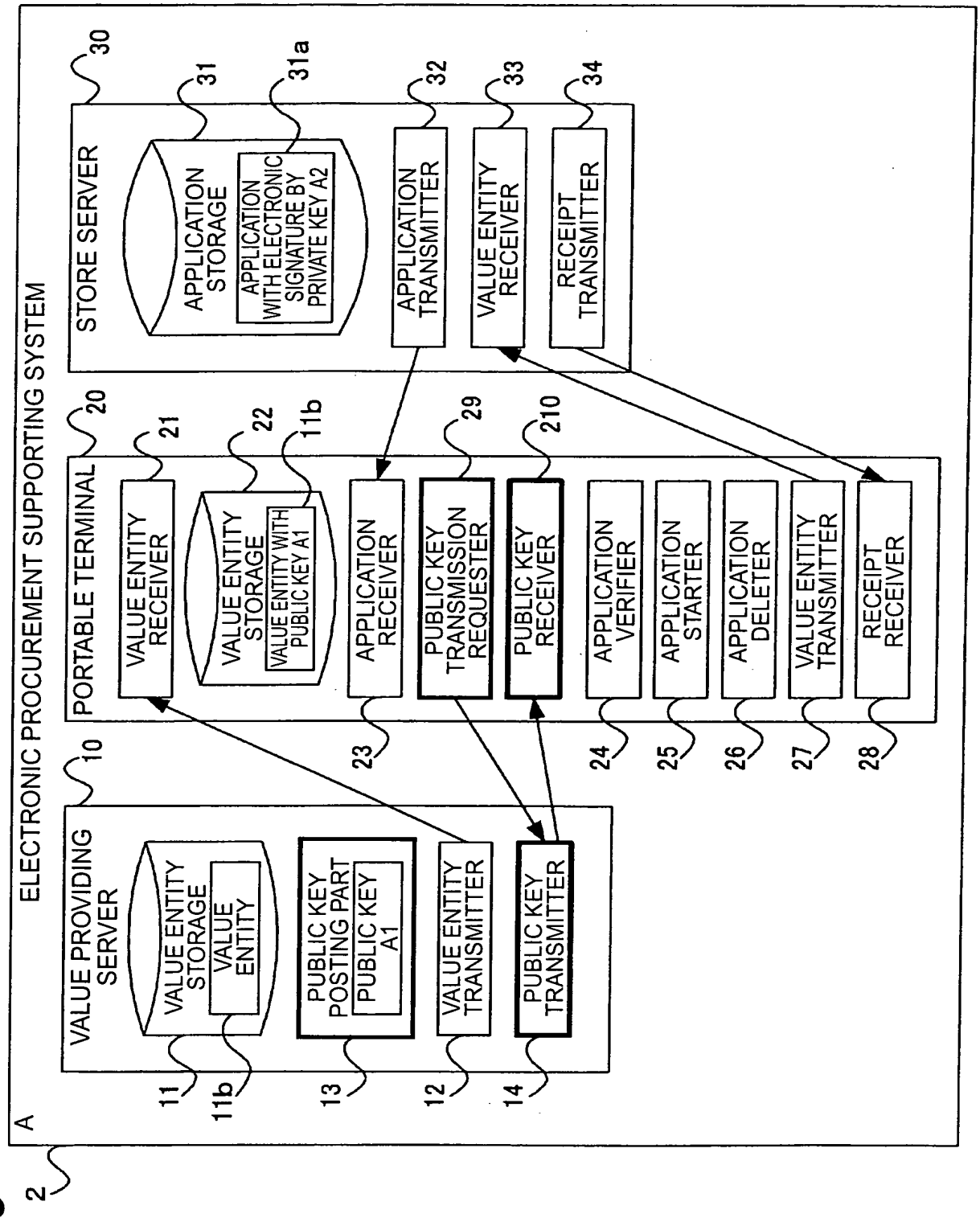

ELECTRONIC PROCUREMENT SUPPORTING SYSTEM
A
2
STORE SERVER
30
APPLICATION STORAGE
31
APPLICATION WITH ELECTRONIC SIGNATURE BY PRIVATE KEY A2
31a
APPLICATION TRANSMITTER
32
VALUE ENTITY RECEIVER
33
RECEIPT TRANSMITTER
34
PORTABLE TERMINAL
20
VALUE ENTITY RECEIVER
21
VALUE ENTITY STORAGE
22
VALUE ENTITY WITH PUBLIC KEY A1
11b
APPLICATION RECEIVER
23
PUBLIC KEY TRANSMISSION REQUESTER
29
PUBLIC KEY RECEIVER
210
APPLICATION VERIFIER
24
APPLICATION STARTER
25
APPLICATION DELETER
26
VALUE ENTITY TRANSMITTER
27
RECEIPT RECEIVER
28
VALUE PROVIDING SERVER
10
VALUE ENTITY STORAGE
11
VALUE ENTITY
11b
PUBLIC KEY POSTING PART
13
PUBLIC KEY A1
VALUE ENTITY TRANSMITTER
12
PUBLIC KEY TRANSMITTER
14

Fig.8

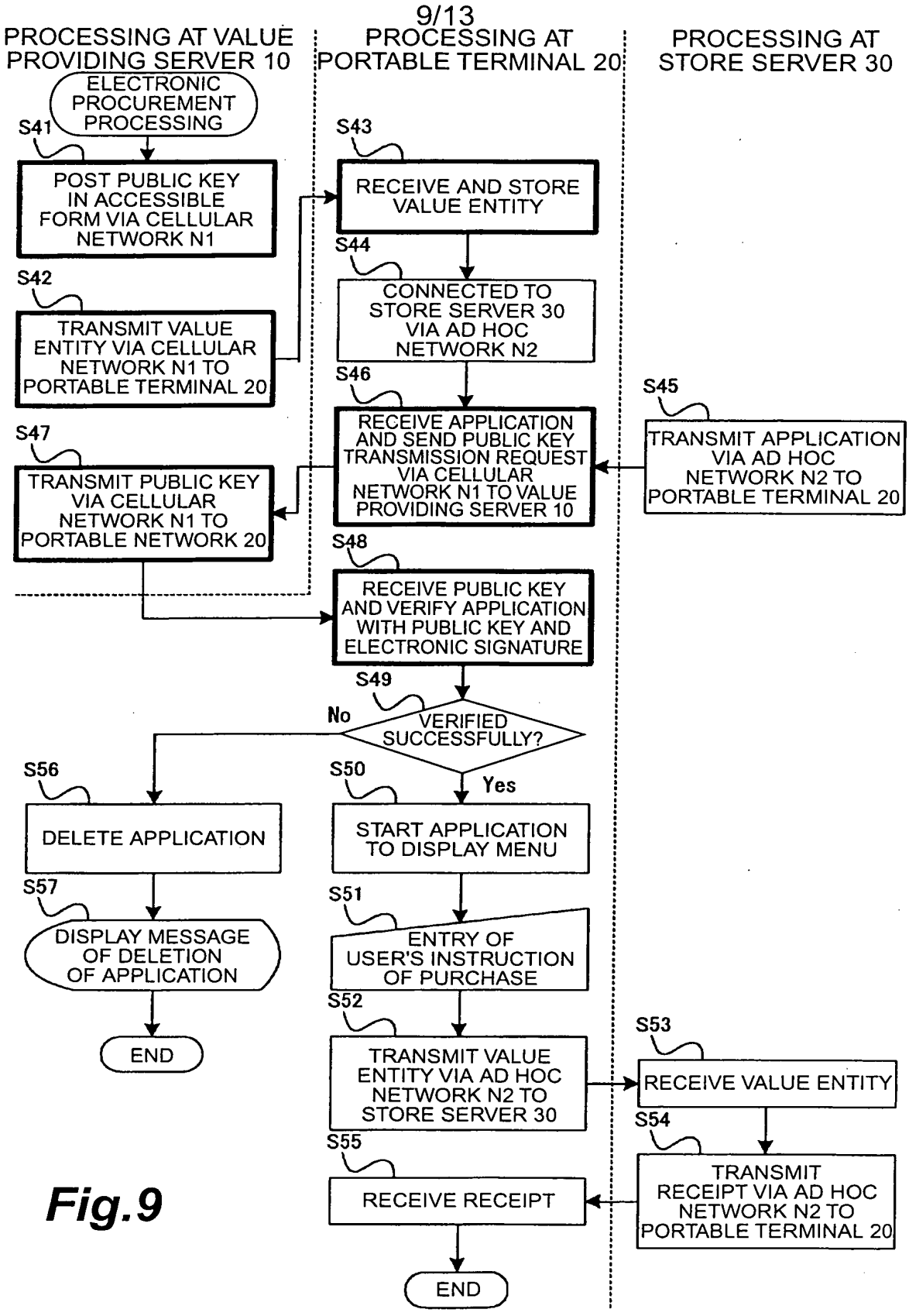

PROCESSING AT VALUE PROVIDING SERVER 10
PROCESSING AT PORTABLE TERMINAL 20
PROCESSING AT STORE SERVER 30
ELECTRONIC PROCUREMENT PROCESSING
S41
POST PUBLIC KEY IN ACCESSIBLE FORM VIA CELLULAR NETWORK N1
S42
TRANSMIT VALUE ENTITY VIA CELLULAR NETWORK N1 TO PORTABLE TERMINAL 20
S43
RECEIVE AND STORE VALUE ENTITY
S44
CONNECTED TO STORE SERVER 30 VIA AD HOC NETWORK N2
S45
TRANSMIT APPLICATION VIA AD HOC NETWORK N2 TO PORTABLE TERMINAL 20
S46
RECEIVE APPLICATION AND SEND PUBLIC KEY TRANSMISSION REQUEST VIA CELLULAR NETWORK N1 TO VALUE PROVIDING SERVER 10
S47
TRANSMIT PUBLIC KEY VIA CELLULAR NETWORK N1 TO PORTABLE NETWORK 20
S48
RECEIVE PUBLIC KEY AND VERIFY APPLICATION WITH PUBLIC KEY AND ELECTRONIC SIGNATURE
S49
No
VERIFIED SUCCESSFULLY?
Yes
S50
START APPLICATION TO DISPLAY MENU
S51
ENTRY OF USER'S INSTRUCTION OF PURCHASE
S52
TRANSMIT VALUE ENTITY VIA AD HOC NETWORK N2 TO STORE SERVER 30
S53
RECEIVE VALUE ENTITY
S54
TRANSMIT RECEIPT VIA AD HOC NETWORK N2 TO PORTABLE TERMINAL 20
S55
RECEIVE RECEIPT
END
S56
DELETE APPLICATION
S57
DISPLAY MESSAGE OF DELETION OF APPLICATION
END

Fig.9

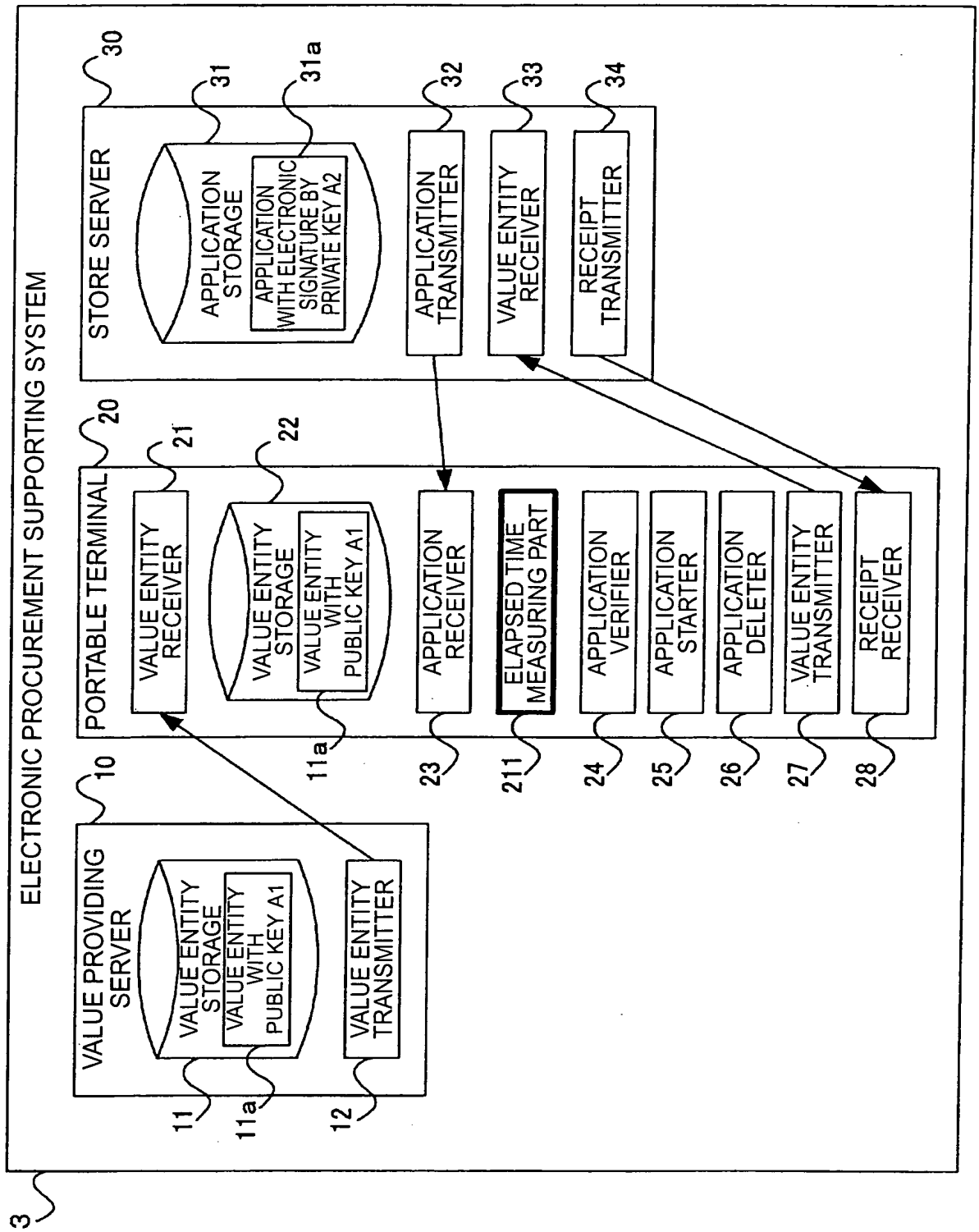

ELECTRONIC PROCUREMENT SUPPORTING SYSTEM
3
STORE SERVER
30
APPLICATION STORAGE
31
APPLICATION WITH ELECTRONIC SIGNATURE BY PRIVATE KEY A2
31a
APPLICATION TRANSMITTER
32
VALUE ENTITY RECEIVER
33
RECEIPT TRANSMITTER
34
PORTABLE TERMINAL
20
VALUE ENTITY RECEIVER
21
VALUE ENTITY STORAGE
22
VALUE ENTITY WITH PUBLIC KEY A1
11a
APPLICATION RECEIVER
23
ELAPSED TIME MEASURING PART
211
APPLICATION VERIFIER
24
APPLICATION STARTER
25
APPLICATION DELETER
26
VALUE ENTITY TRANSMITTER
27
RECEIPT RECEIVER
28
VALUE PROVIDING SERVER
10
VALUE ENTITY STORAGE
11
VALUE ENTITY WITH PUBLIC KEY A1
11a
VALUE ENTITY TRANSMITTER
12

Fig.10

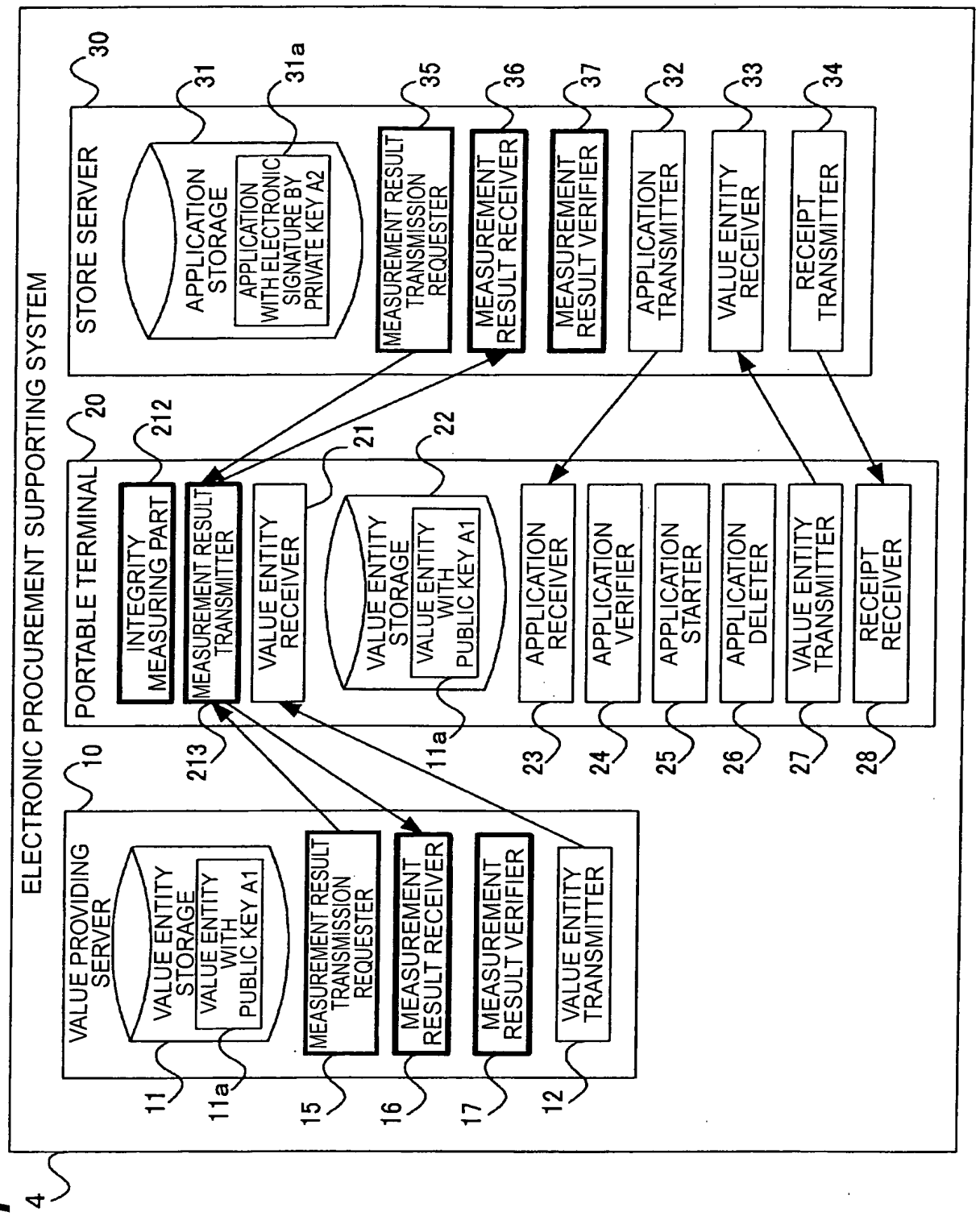

ELECTRONIC PROCUREMENT SUPPORTING SYSTEM
4
STORE SERVER
30
APPLICATION STORAGE
APPLICATION WITH ELECTRONIC SIGNATURE BY PRIVATE KEY A2
31
31a
MEASUREMENT RESULT TRANSMISSION REQUESTER
35
MEASUREMENT RESULT RECEIVER
36
MEASUREMENT RESULT VERIFIER
37
APPLICATION TRANSMITTER
32
VALUE ENTITY RECEIVER
33
RECEIPT TRANSMITTER
34
PORTABLE TERMINAL
20
INTEGRITY MEASURING PART
212
MEASUREMENT RESULT TRANSMITTER
213
VALUE ENTITY RECEIVER
21
VALUE ENTITY STORAGE
VALUE ENTITY WITH PUBLIC KEY A1
22
11a
APPLICATION RECEIVER
23
APPLICATION VERIFIER
24
APPLICATION STARTER
25
APPLICATION DELETER
26
VALUE ENTITY TRANSMITTER
27
RECEIPT RECEIVER
28
VALUE PROVIDING SERVER
10
VALUE ENTITY STORAGE
VALUE ENTITY WITH PUBLIC KEY A1
11
11a
MEASUREMENT RESULT TRANSMISSION REQUESTER
15
MEASUREMENT RESULT RECEIVER
16
MEASUREMENT RESULT VERIFIER
17
VALUE ENTITY TRANSMITTER
12

Fig.11

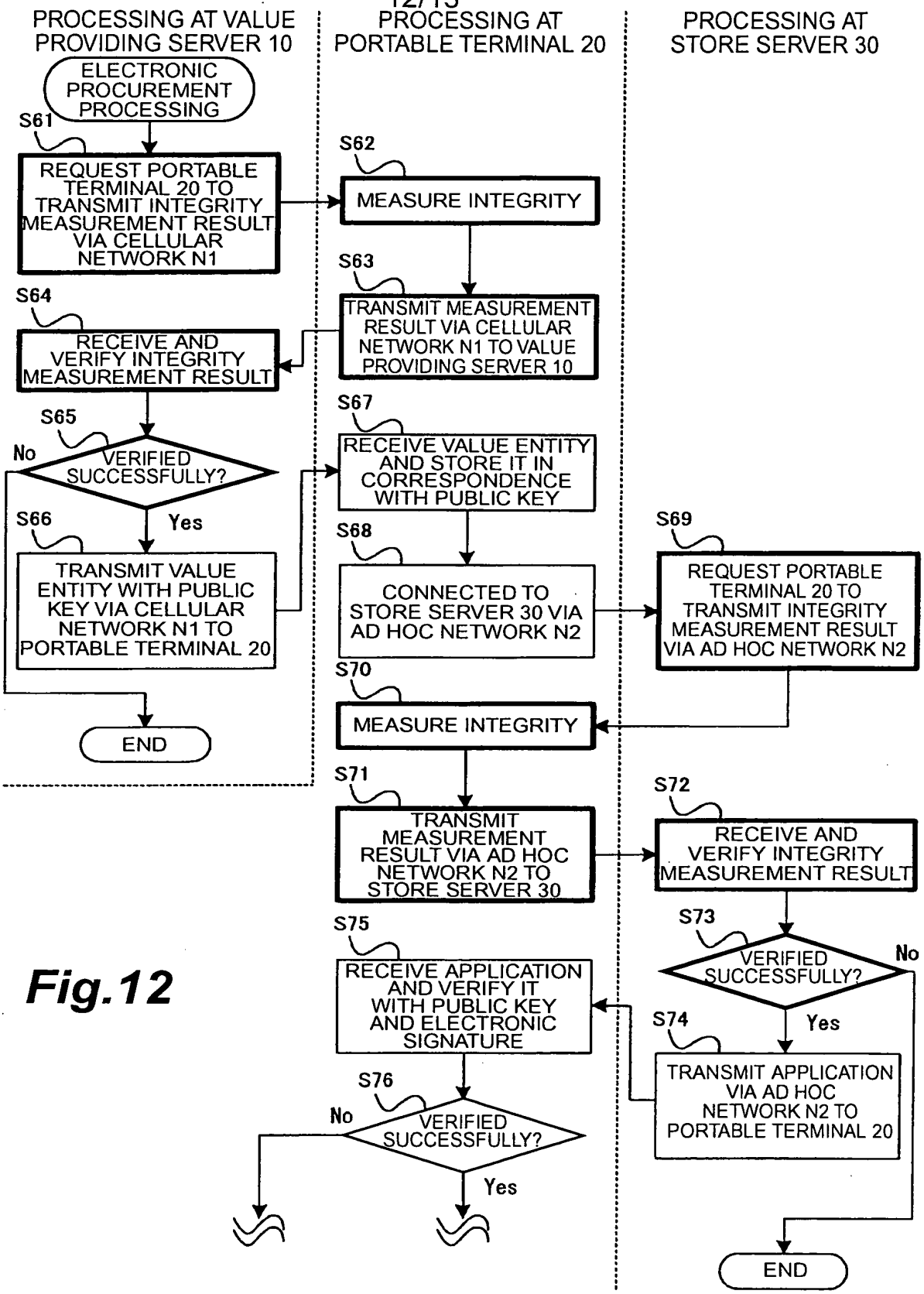
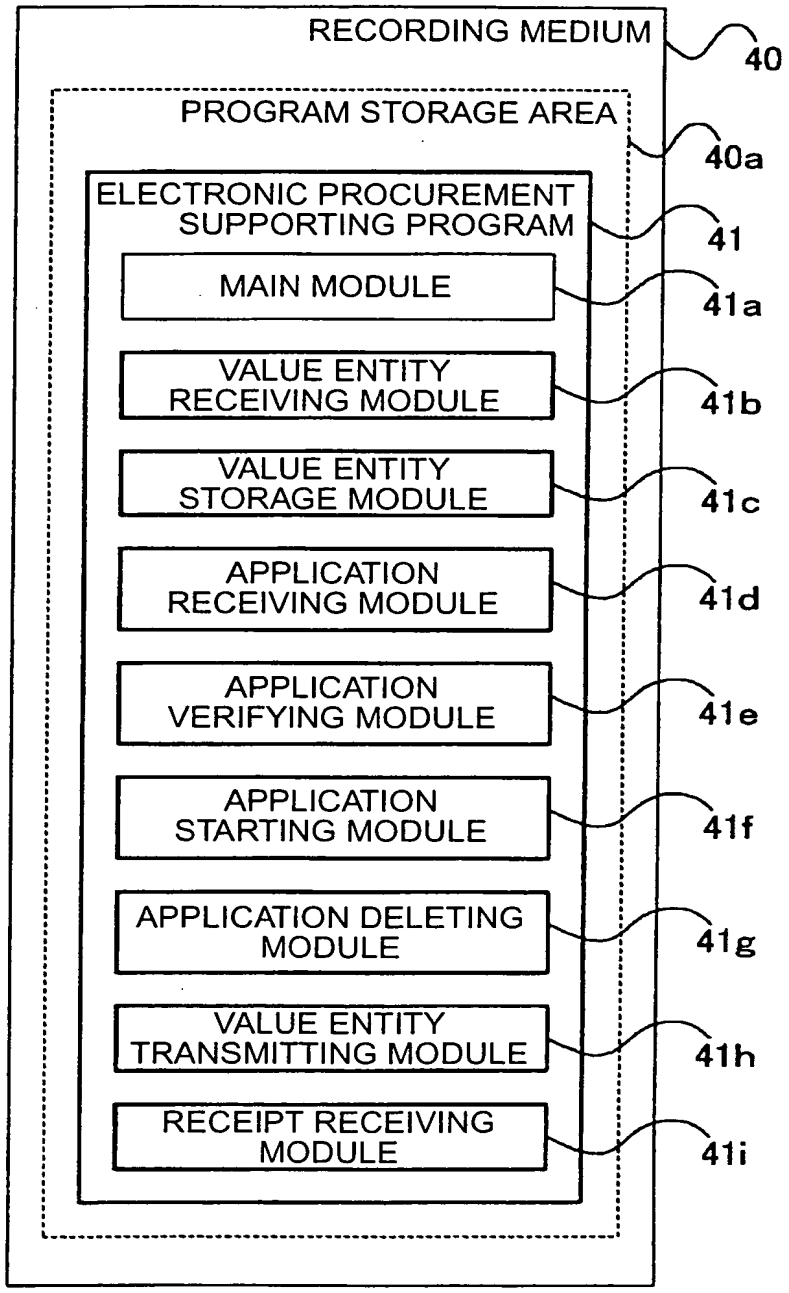

PROCESSING AT VALUE PROVIDING SERVER 10
PROCESSING AT PORTABLE TERMINAL 20
PROCESSING AT STORE SERVER 30
ELECTRONIC PROCUREMENT PROCESSING
S61
REQUEST PORTABLE TERMINAL 20 TO TRANSMIT INTEGRITY MEASUREMENT RESULT VIA CELLULAR NETWORK N1
S62
MEASURE INTEGRITY
S63
TRANSMIT MEASUREMENT RESULT VIA CELLULAR NETWORK N1 TO VALUE PROVIDING SERVER 10
S64
RECEIVE AND VERIFY INTEGRITY MEASUREMENT RESULT
S65
No
VERIFIED SUCCESSFULLY?
Yes
S66
TRANSMIT VALUE ENTITY WITH PUBLIC KEY VIA CELLULAR NETWORK N1 TO PORTABLE TERMINAL 20
END
S67
RECEIVE VALUE ENTITY AND STORE IT IN CORRESPONDENCE WITH PUBLIC KEY
S68
CONNECTED TO STORE SERVER 30 VIA AD HOC NETWORK N2
S69
REQUEST PORTABLE TERMINAL 20 TO TRANSMIT INTEGRITY MEASUREMENT RESULT VIA AD HOC NETWORK N2
S70
MEASURE INTEGRITY
S71
TRANSMIT MEASUREMENT RESULT VIA AD HOC NETWORK N2 TO STORE SERVER 30
S72
RECEIVE AND VERIFY INTEGRITY MEASUREMENT RESULT
S73
VERIFIED SUCCESSFULLY?
No
Yes
S74
TRANSMIT APPLICATION VIA AD HOC NETWORK N2 TO PORTABLE TERMINAL 20
S75
RECEIVE APPLICATION AND VERIFY IT WITH PUBLIC KEY AND ELECTRONIC SIGNATURE
S76
No
VERIFIED SUCCESSFULLY?
Yes
END

Fig.12

Fig.13


RECORDING MEDIUM
40
PROGRAM STORAGE AREA
40a
ELECTRONIC PROCUREMENT SUPPORTING PROGRAM
41
MAIN MODULE
41a
VALUE ENTITY RECEIVING MODULE
41b
VALUE ENTITY STORAGE MODULE
41c
APPLICATION RECEIVING MODULE
41d
APPLICATION VERIFYING MODULE
41e
APPLICATION STARTING MODULE
41f
APPLICATION DELETING MODULE
41g
VALUE ENTITY TRANSMITTING MODULE
41h
RECEIPT RECEIVING MODULE
41i